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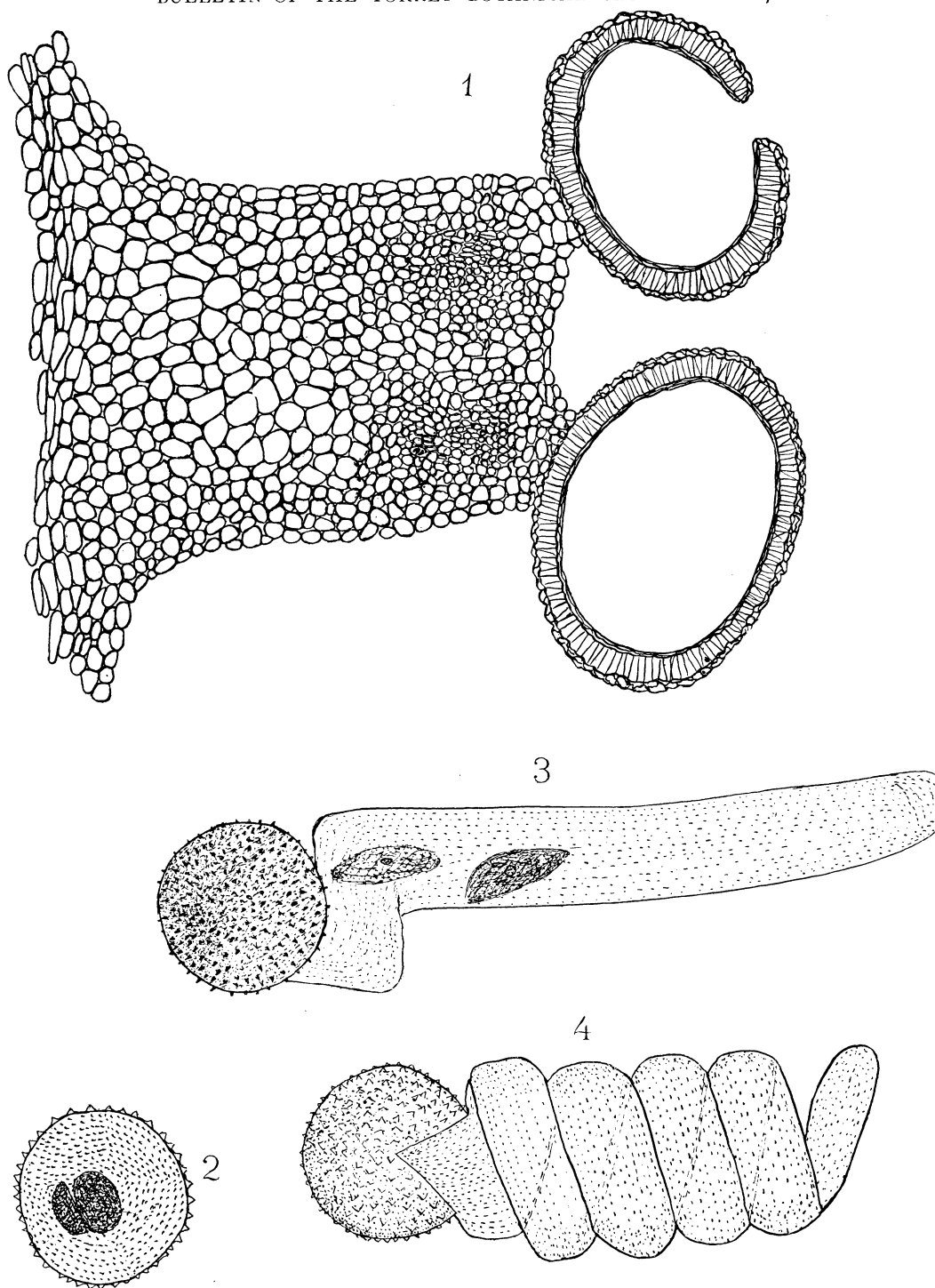
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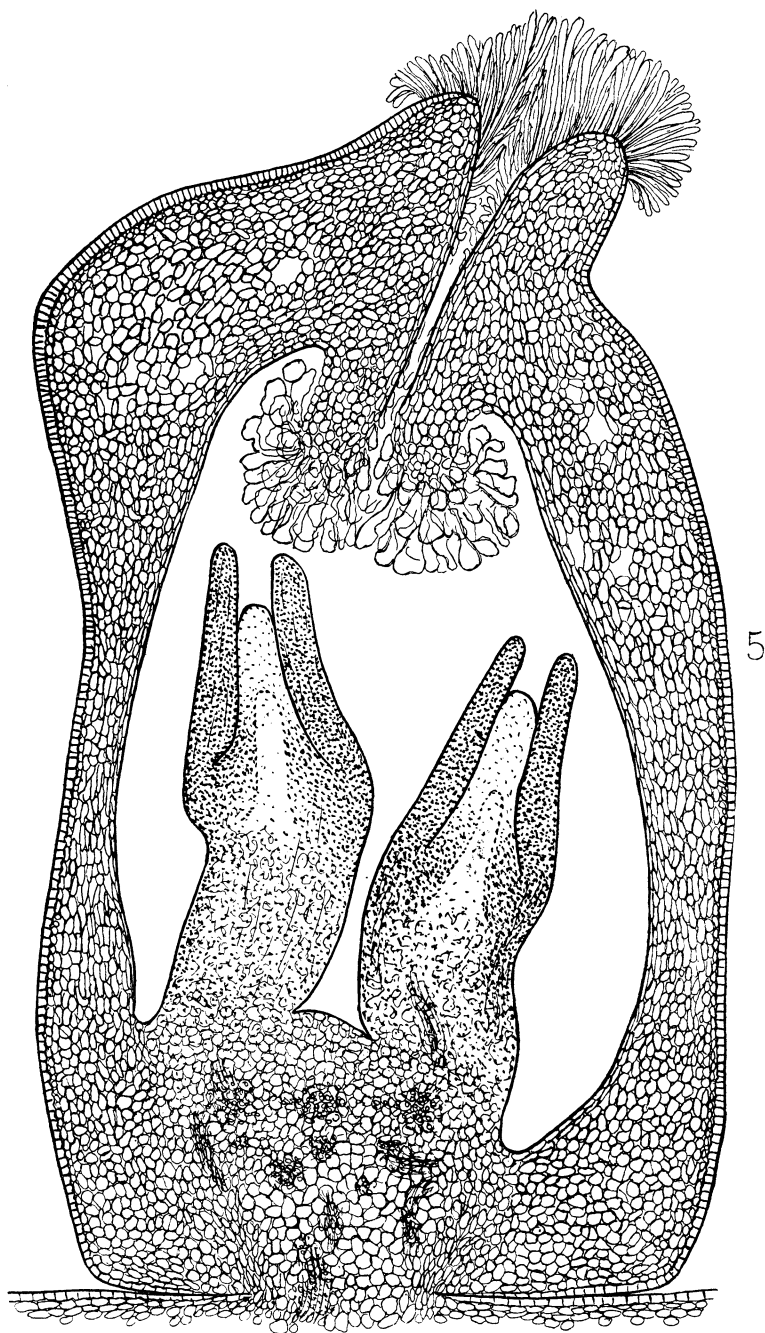
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STAMENS AND POLLEN OF ARISAEMA.



SECTION OF PISTIL OF ARISAEMA.

## The Stigmas and Pollen of *Arisaema*.\*

BY W. W. ROWLEE.

(PLATES 272, 273.)

The native Araceae fall into two natural groups. One group, which Dr. Gray in his Manual calls "the genuine Araceae," consists of the genera *Arisaema*, *Peltandra* and *Calla*. The flowers in this group have no floral envelopes and are almost always monoecious or dioecious by the suppression of either the stamens or pistil.

The other group consists of *Spathyema*, *Orontium* and *Acorus*, genera composed of plants having complete and perfect flowers. This group is much more generalized in its characters than the other, and if either deserves to be called the "genuine Araceae," this, it seems to me, is the one.

So general is the belief now that the Araceae and the Lemnaceae present an illustration of specialization by reduction, it need hardly be mentioned that *Arisaema* and its congeners have departed farther from the ancestral forms than *Calla* and its congeners.

The stamens of *Arisaema* appear to stand singly upon the spadix, each stamen representing a single flower. In *A. triphyllum* this flower really consists of two stamens, the filaments of which are grown together so completely as to present the appearance of a single stamen.

The number of cells in the anther and the vascular strands in the filament reveal the fact that cohesion has taken place. The anthers are also simple in their structure. See 1, plate (I.).

While collecting material for class-work in the spring of 1895, I put a spadix of *Arisaema triphyllum* into alcohol for study. Later when sections were made it was found that although the anthers had dehisced, nevertheless the anther cavities had considerable pollen in them, and that many of these pollen grains, still remaining in the anther, had developed tubes. In some, the tubes were long, in others short, in some they had barely left the grain.

The longer ones instead of growing out in a straight path showed a great tendency to grow back upon themselves. The appearance at first led me to think that it grew in a close spiral-

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\* Read before Section G, A. A. A. S., Buffalo meeting, August, 1896.

like coil, but further examination showed that the tube folded back and forth upon itself in such a way as to form a double layer. This peculiar growth was due in all probability to the meager amount of moisture in the anther, the folding serving to conserve moisture most effectively. Some tubes made as many as five double folds. Apparently the folding occurred after the tube had attained considerable length.

Repeated examination of the pollen of both *Arisaema triphyllum* and *A. Dracontium* failed to afford another specimen in which germination had taken place, and it seemed scarcely probable that this precocious development would occur frequently. It may have been due to the season or the situation; so far as I can see, it in no way benefits the plant.

Warming, in his Systematic Botany, makes a group of monocotyledons which he calls the Enantioblastae, remarking that these plants ought perhaps to be amalgamated with the other orders. Although the Araceae are not included in this group, both species of *Arisaema* have truly enantioblastic ovules. The stigmas of *Arisaema* are remarkable in that the stigmatic surface not only covers the external surface of the capitate stigma, but extends down the short *open* style and forms a stigmatic surface at the summit of the cavity of the ovary, very much like the stigma on the outside of the ovary. The stigmatic hairs are club-shaped, quite long (short in the tube) and are not septate. They are closely packed together. The erect ovule reaches up to the hairs within the ovary. It remains to be seen just what the course of the pollen tube in these hairs is. It seems reasonable to suppose that the tube would enter the cavity of the ovary through the opening in the hollow style and that its entrance would be facilitated by the stigmatic hairs.

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#### Explanation of Plates.

##### PLATE 272.

Fig. 1. Vertical section of consolidated stamens of *Arisaema triphyllum*, showing anthers and anther-cavities, also structure of filament. ( $\times 125$ .)

Fig. 2. Pollen grain. Fig. 3. Pollen grain germinated. Fig. 4. Pollen grain germinated, the tube closely folded upon itself. (Figs. 2, 3 and 4,  $\times 1400$ .)

##### PLATE 273.

Fig. 5. Vertical section of pistil showing ovules and stigma. ( $\times 350$ .)